



Contribution ID: 254

Type: **Oral**

Tunneling of Two Bosonic Atoms From a One-Dimensional Anharmonic Trap

We calculate tunneling rates of two interacting atoms confined in an anharmonic trap. We consider the ground and excited states with respect to relative and center-of-mass motions and observe a monotonic and non-monotonic behavior of the tunneling rates as a function of the coupling strength. The origin of a such behavior lies in an initial wave-packet distribution. We also find that the only possible tunneling scenario in the considered cases is a sequential particle tunneling. Another interesting feature of the tunneling from the excited states is a two-stage decay in which the population of the atoms of different quantum states during the tunneling process occurs.

Acknowledgements: The work was financially supported by a grant of the Plenipotentiary Representative of the Republic of Kazakhstan to JINR.

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Track Classification: Theoretical Physics